Session 607

Practical Uses of XML With WebObjects

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What You'll Learn

- Java serialization
  - Encoding/Decoding
- What is XML, XML-RPC, and SOAP
  - Basics of XML
  - Mechanics with WebObjects
  - What's new w/XML in WO 5.0 (Xerces)
  - Server to Server (the cool stuff)

Java Serialization Benefits

- Easy—Java serialization is simple
  - **Implements Serializable**
- Java runtime does the heavy lifting for us
- Industry standard

Native Java Serialization

- Session archiving works
- All key classes, i.e.:
  - WOSession
  - EOGenericRecord
  - WOComponent
- Most classes can be archived that implemented NSCoding

Demo

Persistent Session Store

Han Ming Ong
WebObjects Engineer

XML—eXtensible Markup Language

- Content centric
- “Plain” text
- Syntax—easy to learn
  - Well formed
  - Valid
- Becoming standard for inter-app communication and data interchange

Sample XML Document

```
<?xml version=“1.0”?>
<model>
        <entity name=“RentalItem" xmlTag=“rental">
                <property name="qty" xmlTag="quantity" attribute="YES"/>
                <property name="movie" xmlTag="movie"/>
                <property name="customer" xmlTag="customer"/>
        </entity>
        <entity name="MyMovie" xmlTag="movie">
                <property name="title" xmlTag="name" attribute="YES"/>
                <property name="dateReleased" xmlTag="date“/>
                <property name="roles" xmlTag="role“/>
                <property name="category" xmlTag="cat"/>
        </entity>
</model>
```

Uses for XML

XML for Complex Messaging (SOAP and XML-RPC)

XML for Simple Data Interchange

XML—the Standard

XML With WO

- WO both client and server
  - WOMessage
  - WORequest
  - WOResponse
- WOXMLCoder and WOXMLDecoder

- NEW w/ 5.0: Xerces parser

Encoding

- Object → XML in a single method
- Custom encoder methods
  - Custom Types
  - Avoiding the “whole graph”
- Mapping file

WOXMLCoder

encodeRootObjectForKey(Object anObject, String key)

- String, Number, NSArray, NSDictionary
- NSTimestamp, NSData
- EOEnterpriseObject (or a subclass)
- An object that implements WOXMLCoding

encodeBooleanForKey(boolean flag, String key)
encodeDoubleForKey(double aDouble, String key)
encodeFloatForKey(float aFloat, String key)
encodeIntForKey(int anInt, String key)

Encoding—Samples

```
String xmlString = WOXMLCoder.coder().
        encodeRootObjectForKey(movieArray, “movie”);
```

```
WOXMLCoder coder;
coder = WOXMLCoder.coderWithMapping(mappingFileURL);
String xmlString= coder.encodeRootObject (movieArray,
   “movie”);
```

Encoding—Mapping File

```
<model>
        <entity name=“RentalItem" xmlTag=“rental">
                <property name="qty" xmlTag="quantity" attribute="YES"/>
                <property name="movie" xmlTag="movie"/>
                <property name="customer" xmlTag="customer"/>
        </entity>
        <entity name="MyMovie" xmlTag="movie">
                <property name="title" xmlTag="name" attribute="YES"/>
                <property name="dateReleased" xmlTag="date“/>
                <property name="roles" xmlTag="role“/>
                <property name="category" xmlTag="cat"/>
        </entity>
</model>
```

Decoding

- XML → Object in a single method
- Mapping file
- SAX
- Example: RelatedLinks
- Pitfall to avoid: attribute versus array of one

WOXMLDecoder

decodeRootObject(NSData data)

decodeRootObject(String XMLfileURL)

decodeRootObject(org.xml.sax.InputSource inputSource)

- String, Number, NSArray, NSDictionary
- NSTimestamp, NSData
- EOEnterpriseObject (or a subclass)
- An object that implements WOXMLCoding

WOXML Example

```
public class Person extends EOGenericRecord implements WOXMLCoding {

    String name;  int age;

    public Person() {
        name = "John Smith";
        age = 2; }

 // constructor required for decoding
    public Person( WOXMLDecoder decoder ) {
        name = (String) decoder.decodeObjectForKey( "Name” );
        age = decoder.decodeIntForKey( "Age” ); }

public void encodeWithWOXMLCoder( WOXMLCoder coder ) {
        coder.encodeObjectForKey( name, "Name” );
        coder.encodeIntForKey( age, "Age” ); }  }
```

Demo

Simple WebObjects and XML

Mike Brumbelow
Technical Architect

SAX—A Parser API

- Event-based framework for parsing
- SAX is not a parser
  - Defines events, but uses callback to process document
  - Events: start of document, etc.
- Xerces is a SAX parser
- SAX 2 adds Namespaces

Document Object Model

- SAX provides access to documents data
- DOM provides means to manipulate
- Memory considerations
  - Whole document must be in memory
  - Can fail for large documents

Java XML API

- Neither SAX nor DOM
- Purely abstract layer for both
- Allows any parser to easily plug in
  - Vendor independent
- Simple
  - Only 6 classes

Component Model

- WebObjects Components
- WebObjects Builder
- WOGenericContainer, WOXMLNode
- Easiest way to learn
- Don’t forget for Browsers:

```
// We need to set the mime type to “text/xml”
public void appendToResponse(WOResponse response, WOContext context)
  {
    super.appendToResponse(response, context);
    response.setHeader("text/xml", "content-type");
  }
```

DTDs and Schemas

- Document Type Definition
  - Rules for syntax of XML documents
  - Old way and has peculiar syntax
- Schemas
  - Same goals as DTDs
  - Syntax is written in XML
  - Allows data typing

DTDs and Schemas (Cont.)

- Schema's in XML allow:
  - Use of any parser
  - Hierarchical declarations—scoping
- May 2nd W3C Schema Recommendation released
  - **http://www.w3c.org/XML/Schema**

Namespaces

- Similar to
  - C++ namespaces and
  - Java packages
- Designed to avoid name conflicts
  - Works poorly in DTD context

XSL—eXtensible Stylesheet Language

- Transforms XML data from one XML format to another
  - Maps between one DTD or Schema to another

XSLT—eXtensible Stylesheet Language Transformation

- Text-based transformations
- Merges XSLT stylesheet with XML document
  - Often used with CSS which does actual formatting
- Requires XSLT processor
  - Ex. SAXON

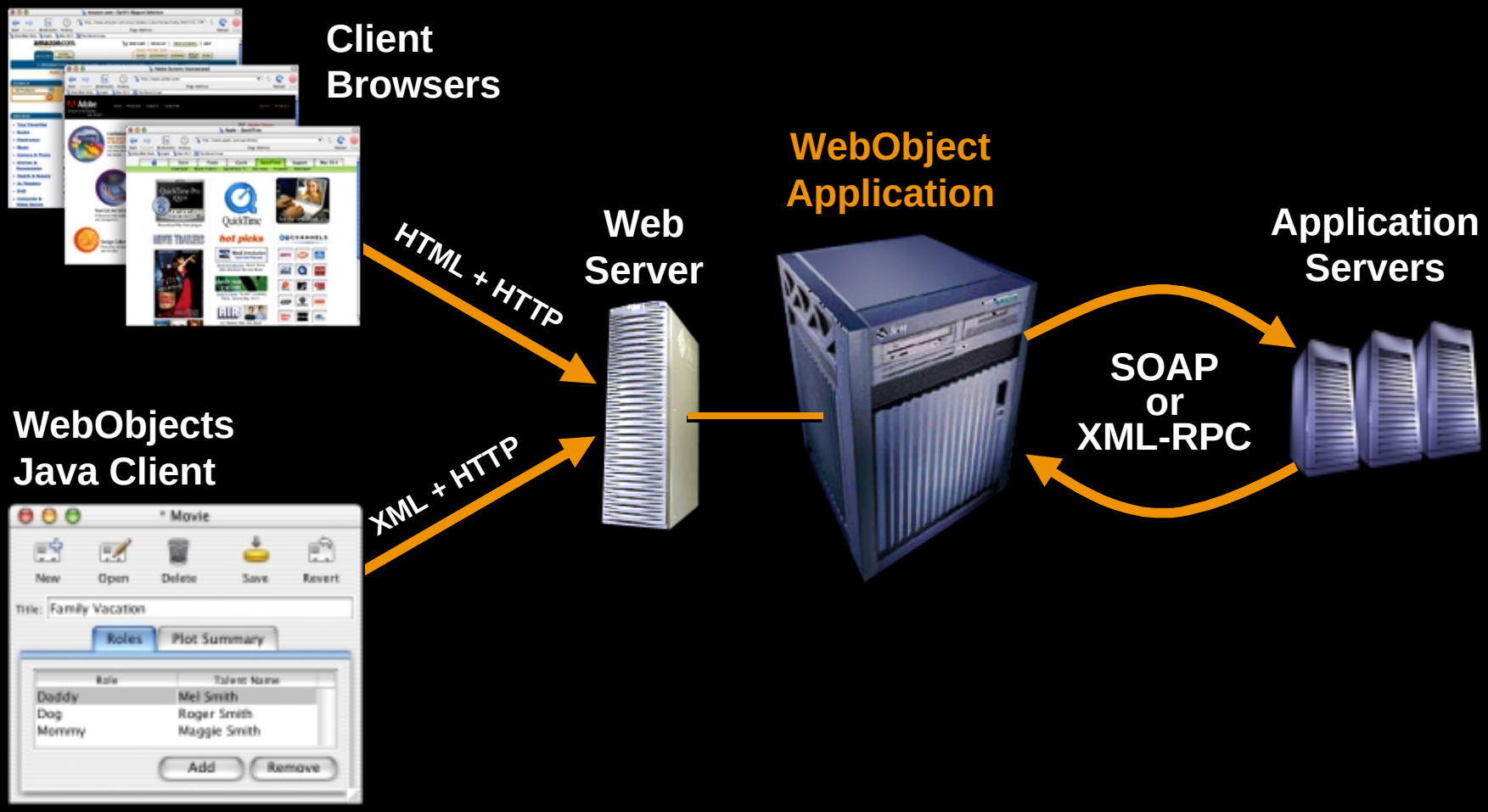
XML for Presentation

- Most popular use of XML
- Content is in XML format
- Separates content from format

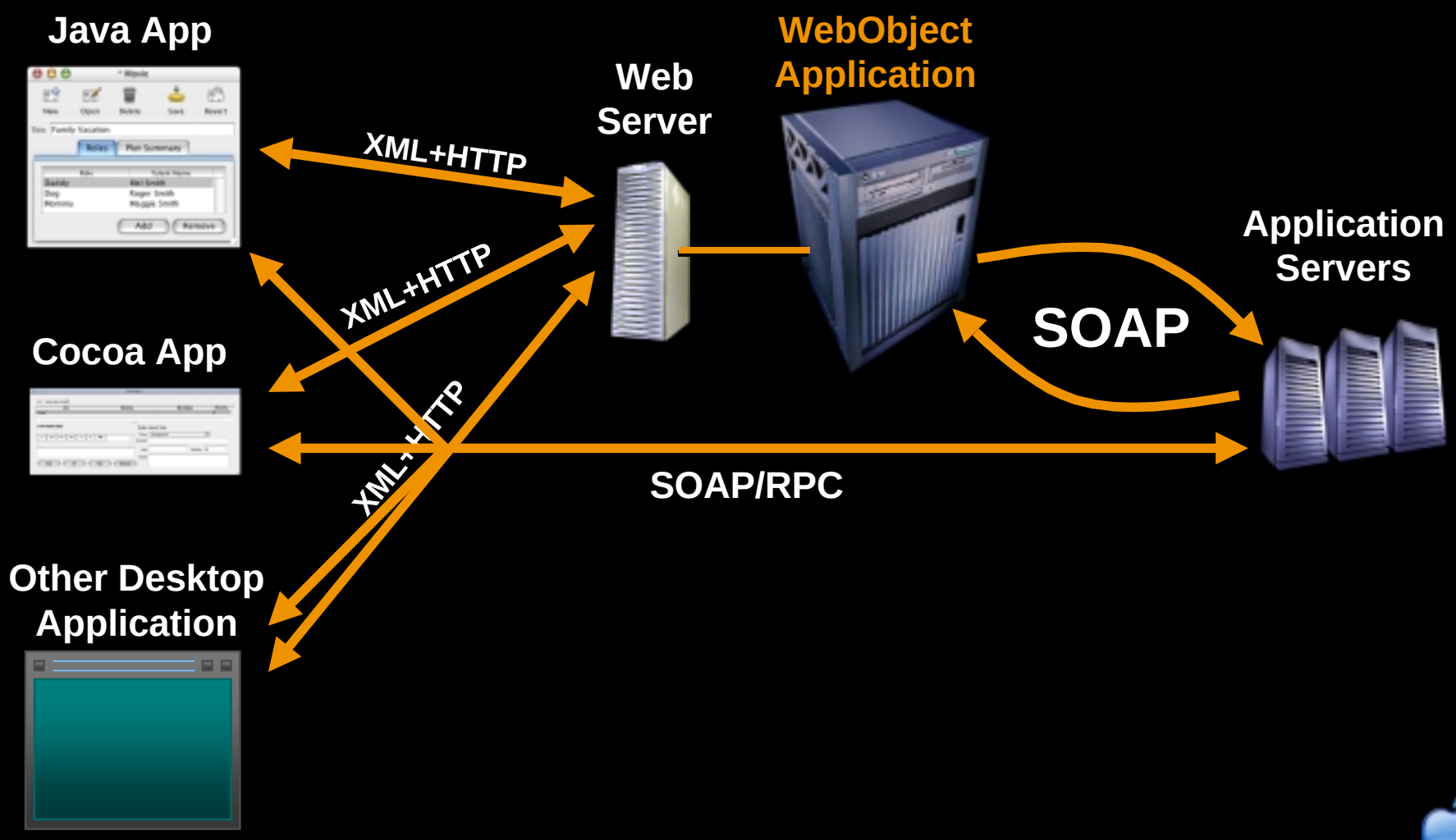
XML-RPC and SOAP

- XML-RPC = Remote Procedure Calls
  - Parameter marshalling mechanism
  - Simpler protocol than SOAP
- SOAP = Simple Object Access Protocol
  - XML-RPC w/ more typing specifications
  - More compact due to more types

Thin Client SOAP/RPC



Thick Client SOAP/RPC



SOAP

- Wire Protocol Specification
  - Similar to IIOP and DCOM
- Transport layer independent
  - TCP/IP, IPX SPX, etc.
- Platform and Language independent
- Is NOT Object Oriented
  - Can be used to serialize objects

SOAP Internals

- SOAP Envelope Metaphor
- SOAP Header
  - Modular way to extend the message
- SOAP Body
  - Holds message payload
- SOAP Fault
  - Represents an error

SOAP and XML-RPC

- Similar encoding schemes for Types
- SOAP is W3C Note
- XML-RPC is simpler to implement
- Neither protocol addresses
  - Object activation
  - Garbage collection

Demo

The “Big” Demo WebObjects SOAP Application

Mike Brumbelow
Technical Architect

SOAP Demo Architecture

WebObjects Client Application

WebObjects SOAP Server

SOAP Request

SOAP Response

Resources—URLs

- www.w3.org
  - /XML/Schema
  - /TR/REC-xml
  - /TR/2000/NOTE-SOAP-20000508
- xml.apache.org

Resources—Books

- Java and XML—O'Reilly
- Professional XML—WROX
  - (The big red book)
- Understanding SOAP—SAMS

WebObjects Lab

- Located downstairs in Room K
- Lab hours
  - Monday 12:00pm–6:00pm
  - Tuesday 10:30am–6:00pm
  - Wednesday 10:30am–6:00pm
  - Thursday 10:30am–6:00pm
  - Friday 10:30am–3:30pm

☑ Vote for WebObjects as Best App Server

http://developer.apple.com/webobjects

Roadmap

610 Introduction to Data Modeling & Connectivity	Room A1 **Thurs., 9:00am**
613 Advanced Enterprise Objects Framework	Room A1 **Thurs., 3:30pm**
618 Optimizing WebObjects Applications	Room A1 **Fri., 2:00pm**

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Q&A

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Worldwide Developers Conference 2001